July 20, 1943. E. A. NORDBERG 2,324,798

SWITCH

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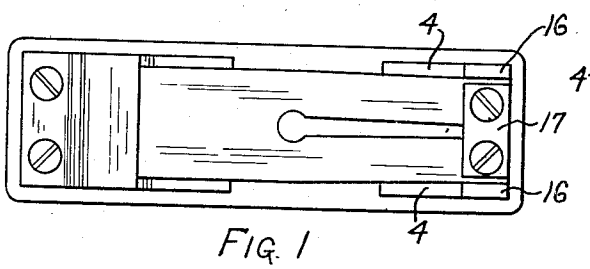


FIG. 1

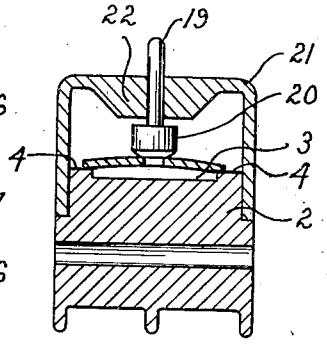


FIG. 3

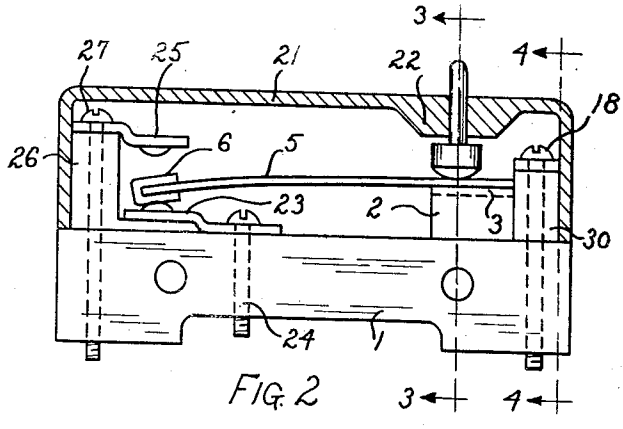


FIG. 2

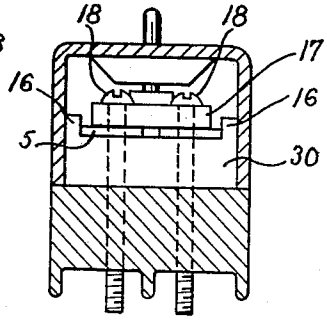


FIG. 4

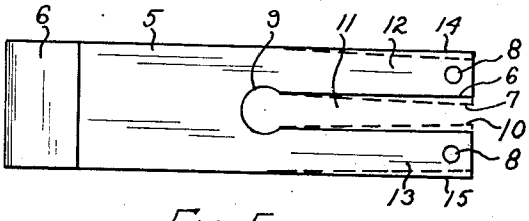


FIG. 5

INVENTOR.
Ernst A. Nordberg
BY Ezekiel Wolf
his ATTORNEY.

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SWITCH

Ernst A. Nordberg, Sharon, Mass., assignor to Mu Switch Corporation, Canton, Mass.

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6 Claims. (Cl. 200—67)

The present invention relates to a snap switch of the type particularly designed to provide a rapid snap action of the switch contacts either together or apart on a small motion and light pressure of the switch button or operating pin.

Various types of switches of this general nature have been used for some time. In most of these switches a spring member carrying a switch contact at its end is given a temporary balance by creating a spring tension in the spring itself such that the spring has a bowed position from the horizontal, either upwards or downwards at its unsupported end.

When the pressure is applied at a certain point on the spring, the balance is disturbed, and with a small motion the free end of the spring snaps from its bowed position in one direction to that in the opposite direction. The action of the switch in the present invention is the same as that described above and the invention is claimed only to reside in the particular construction herein employed in obtaining the functioning described above.

The difficulties in most switches of this type, which are precision switches, are in the control in manufacture; of the pressure required to operate; of the motion through which the pressure must act, and of the speed with which, and distance through which the contact points travel. The present construction has to do with overcoming these difficulties and with providing a single and cheap construction so that the switch cost and adjustment cost are both small without interfering with the precision, utility and reliability of the switch.

The advantages and features of the present invention will be more readily understood from the specification below, when taken in connection with the drawing illustrating an embodiment of the invention, in which:

Figure 1 shows a plan view of the switch with the cover removed.

Figure 2 shows an elevation of the switch with the cover in section.

Figure 3 shows a section on the line 3—3 of Figure 2.

Figure 4 shows a section on the line 4—4 of Figure 2, and,

Figure 5 shows a plan view of a detail.

Referring to the figures, on the base 1 of "Bakelite" or other suitable insulating material, such as hard rubber, there is provided at one end an extension or platform 2 having a central channel 3 with upwardly extending flanges 4 at the sides of the platform cooperating with the spring element 5 in the manner described below.

The spring 5 is composed of phosphor bronze or other suitable material and has a contact plate 6 bent as a C shaped member around one end of the spring. The spring 5 is elongated in substantially the form of a rectangular flat plate and slotted from the other end in the center as at 11, the slot being terminated in an arcuate hole 9. The slot 11 forms two forked ends 12 and 13 in which are the clearance holes 8, 8.

At the back of the block or extension 2, there is mounted in the base 1 by means of the long studs or screws 18, a metal clamping block 30 which is provided with upwardly extending sides 16 spaced apart a distance less than the normal free width of the spring 5 by the amount of tow-in desired when the spring 5 has its forked ends resting in the well between the sides 16. When the spring 5 is to be put in position on the plate 30, its ends 12 and 13 are towed-in to the dotted line position indicated in Figure 5, so that the side edges 14 and 15 respectively of the forked ends rest against the inside walls 16, 16. The clamping plate 17 with the screws 18, 18 are then put in place and screwed down thus holding the whole assembly in place and clamped to the base 1. The amount of tow-in is predetermined. This produces a flexual strain on the spring 5 and cups the spring transversely downward at the forked end and longitudinally downward at the contact end as indicated more clearly in Figure 2. An operating pin or button 19 with a head 20 at its end bears upon the top surface of the spring 5 over the slot at a point where the bottom of the spring in the center position spans the channel 3 so that the bottom of the spring is clear of the base of the channel as indicated in Figure 3. The pin 19 is mounted in the cover 21 and passes through a hole in the boss 22 of the cover.

The spring at the contact end may be so adjusted in position that the contact 6 touches the lower switch plate 23 mounted on the base 1 by means of the screw 24, or it may be clear of it. When the pin 19 is pressed, the contact 6 jumps and makes contact with the upper switch plate 25 mounted on the block 26 by means of the screw 27.

The action of the spring is such that in its flexed position, it is in equilibrium when towed-in by the end being down. When the pin is pressed, the section under the spring becomes concave upwards and the equilibrium of the spring demands that the end of the spring with

the contact snap upwards making contact with the plate 25.

Very little pressure on the pin and very little motion is required to make the free end of the spring fly upwards with considerable snap and a comparably large amplitude of motion. The advantage of the present invention is that the distance between the flanges 16, 16 may be accurately maintained in the clamping block 30 so that a definite and known amount of tow-in can be had. Further, the location of the pin at the edges of the slot permits the pin to work against each forked end without any interaction between the ends and makes it possible to obtain the snap with light or heavy pressure, whatever may be desired.

Having now described my invention, I claim:

1. A snap switch of the type described, comprising a spring leaf element, means clamping said spring leaf element at one end and leaving the other free, a switch contact plate at the free end adapted to make contact with switching means, said switch leaf at its clamped end being slotted lengthwise with the leaf spring and means clamping said end including a clamping block having shoulders spaced apart a distance just sufficient to receive snugly the side edges of said spring when it is towed inward the desired amount and a clamping plate fitting over said spring and holding said slotted end in a towed-in position.

2. A snap switch of the type described, comprising a base element, a spring leaf element having a substantially elongated shape, means clamping said spring leaf element at one end to the base, said spring leaf being slotted longitudinally in its mid-section at the clamped end thereof, said clamping means holding said slotted end of said switching element in a towed-in position on said base, and comprising a clamping block having a shoulder at either side spaced apart a distance just sufficient to receive snugly the side edges of said spring when it is towed inward the desired amount and means provided at the other end of said spring leaf for making and breaking an electrical contact.

3. A snap switch of the type described comprising a base element, a rectangular spring leaf element being slotted at one end, said slot running lengthwise thereof, said end having clamping holes therethrough, said base carrying a clamping block having flanges spaced closer together than the width of the spring and means holding said spring leaf in said clamping block through said clamping holes whereby the spring leaf is towed inward at said clamping end, the said other end of the spring leaf being free and having a contact element thereon, a second contact element arranged in proximity to the contact element of said spring leaf, said leaf spring being bowed from a horizontal position by the towing-in at the end of the spring and operating means located in the vicinity of the clamping end for throwing the switch from a bowed position in one direction to the horizontal, to a bowed position in the other direction to the horizontal.

4. A snap switch of the type described comprising a rectangular leaf spring having a longitudinal slot at one end forming two forks in said spring, flange means retaining the forks of said spring towed inwardly and means clamping the same to said base comprising clamping holes in each forked section of said spring leaf, a clamping plate, a clamping block and clamping screws, said clamping block having said before mentioned flanges positioned closer together than the width of said spring determining the tow-in of said spring at its slotted end, the other end of said spring having means adapted to make electrical contact for making or breaking the switch circuit and an operating pin positioned over the spring and operating normally thereto for throwing the leaf spring from a position on one side of the horizontal to a position on the other side thereof.

5. A snap switch of the type described, having a base element with a built up portion at one end, said built-up portion being provided with a channel, an elongated leaf spring slotted at one end, means clamping said leaf spring to said built-up portion of the base, said means including means for holding the slotted end of said spring in an inwardly towed-in position, the outer edge surfaces of said slotted section bearing against the built up portion of the base with the central portions of said spring beneath said channel section being unsupported, and an operating pin positioned to operate against the unsupported surface of said spring substantially normal thereto, the other end of said spring carrying a contact member and means making contact therewith in one of the normal positions of said spring.

6. A snap switch of the type described, having a base element, an elongated spring leaf element having one end slotted lengthwise of said spring, means clamping the slotted end of said spring to said base in a towed-in position, said base supporting the edge surfaces of said spring on one side thereof, an operating pin operating normally the said spring on the other side thereof over the section of the spring supported at its surface edge and contact means provided at the unclamped end of the spring for making the electrical contact with contact means mounted on said base and said contact means.

ERNST A. NORDBERG.